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| 09/982,840 | 10/22/2001 | Hiroshi Ikeda | 826.1764 | 8384 |
| 21171 | 7590 | 05/05/2005 | EXAMINER | |
| STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005 | | | DIMYAN, MAGID Y | |
| | | | ART UNIT | PAPER NUMBER |
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DATE MAILED: 05/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/982,840

Applicant(s)

IKEDA ET AL.

Examiner

Magid Y. Dimyan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 25-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-8, 16, 24 and 29-32 is/are rejected.
- 7) ☒ Claim(s) 9-15 and 17-23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Acknowledgement

1. Receipt is acknowledged of the Response to Restriction Requirement, filed on January 03, 2005. The Applicants have elected Group I (claims 1 – 24 and 29 – 32) without traverse. **However, the Applicants should cancel claims 25 – 28 in the next Office Action.** Claims 1 – 32 remain pending in this Application, while claims 25 – 28 are considered withdrawn from consideration by the Examiner.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Route Searching Method and Storage Medium Thereof.

Claim Objections

3. Claims 6 – 23 are replete with grammatical errors, and antecedent basis issues. Some examples are given below, but the Applicants should thoroughly review and revise the claim language:

- Claim 6, line 8, insert --aside-- after “setting”.
- Claim 10, line 3, delete “and” and insert --or--.
- Claim 15, line 3, delete “match” and insert --matching--.
- Claim 20, lines 7, 10, 15 and 20, insert --is-- before “computed”.
- Claim 21, line 10, insert --is-- before “computed”.
- Claim 9, line 2 states “said condition” according to claim 6. Claim 6 does not refer to any condition (antecedent basis issue).
- Claim 10, lines 8 and 9 refers to “the junction pin” according to claim 7. Claim 7 does not refer to a junction pin (antecedent basis issue).
- Claim 15, cites “the route identification codes” according to claim 14. Claim 14 only mentions one route identification code (antecedent basis issue).
- Claim 16, line 7 cites “on the same joint pin”. There is no antecedent basis for the “same joint pin”.
- Claim 24, line 14 cites “pin by pin”. It was never previously established that there were a plurality of pins.

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- Claim 14, lines 4 and 6 cite "positioning immediately before", and "passing control", without providing any information on "before what??" or "control of what??".
- Claims 11, 12 and 13 cite "a path connecting the pins has the longest delay time and the shortest delay time". It is impossible for one path to have both a longest delay time as well as a shortest delay time.
- Claims 20 – 24 are very difficult to understand, and do not provide any significant meaning to the Examiner. These claims should be re-written in comprehensible claim language.

Appropriate corrections and revision are required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1 – 6, 29, 30 and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,401,234 to Alpert et al. (hereinafter, "Alpert").

6. Referring to claims 1, 29 and 32, Alpert discloses a method and system for a search of a signal from a starting point to an end point comprising: setting one or more conditions satisfied by a route to be distinguished from other routes from the starting point to the end point (see Figs. 1a – 2c and 4; col. 1, line 16 – col. 2, line 8; Table III); and distinguishing a route from others depending on whether or not the route satisfies the set condition (in this case, cost function) and carrying out a search for the route from the starting point to the end point on each route to be distinguished from others by a condition (see Fig. 4; col. 6, line 16 – col. 7, line 19). Thus, Alpert teaches the claimed elements.

7. Pursuant to claims 2 and 3, see (5) above; Fig. 4; col. 3, line 61 – col. 5, line 5, which cite the claimed limitations of how routes can be distinguished and selected from other routes using selection rules and conditions (in this case a cost function is used).

8. As per claims 4 and 5, see col. 6, line 16 – col. 7, line 19, which disclose how a route identification code is set for selecting a route from a plurality of routes, as claimed.

9. Regarding claims 6 and 30, Alpert teaches a method and system for a search for a route of a signal from a starting point pin to an end point pin in an electronic circuit

designed by combining cells which are basic devices entered for use in a designing process (see (5) above), comprising: when there are two or more routes from the starting point pin to the end point pin joining one another on the same pin (see Figs. 1a, 1b, 2a and 2b), setting one or more conditions to be satisfied among the two or more routes when one of the two or more routes is selected (see Fig. 4; col. 1, line 65 – col. 2, line 8); and carrying out a search for a route from the starting point pin to the end point pin, while selecting and setting aside only one of the two or more routes satisfying the set conditions (see Fig. 4; col. 6, line 16 – col. 7, line 20). Thus, Alpert recites all the claimed limitations.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Alpert in view of U.S. Patent No. 6,308,306 to Kaneko.

12. The teachings of Alpert pertaining to a route search method for a route of a signal in an IC design are cited above, and described in detail in his invention. However,

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Alpert does not teach selecting a route having the longest or shortest delay time from two or more routes satisfying the set condition. On the other hand, Kaneko discloses a delay route searching method and apparatus, which in fact searches for shortest and longest delay paths in the circuit design (see Kaneko – Figs. 1, 2, 8; col. 1, line 30 – col. 3, line 60; col. 5, line 4 – 13; col. 6, line 39 – 45). Since being able to select route with longest or shortest delay time from a plurality of routes is very important in the optimization of IC designs in terms of performance and area, it would therefore be obvious to a person of ordinary skill in the art at the time of the invention to combine the teachings of Alpert and Kaneko to obtain the same claimed invention.

13. Claims 8, 16, 24 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alpert in view of U.S. Patent No. 5,784,600 to Doreswamy et al. (hereinafter, “Doreswamy”).

14. Referring to claim 8, Alpert does not teach the inclusion of a clock source outputting an externally input or internally generated clock signal in his invention cited above. However, Doreswamy discloses a method of generating exact-length wires for routing critical signals by using a search algorithm (see Fig. 10a; col. 14, lines 35 – 65) which also includes clock signals and clock buffer insertion (see Fig. 13; col. 1, line 17 to col. 3, line 63). Since all integrated circuit designs must include a clock or a plurality of clocks in order to be operational, it would therefore be obvious to a person of ordinary

skill in the art at the time of the invention to combine the teachings of Alpert and Doreswamy to achieve the same invention as claimed.

15. As for claims 16, 24 and 31, all the limitations of these claims are disclosed by Alpert as cited in (5) – (13) above, except for the element of using circuit synthesis in synthesizing the two or more routes satisfying a condition into one route. However, Doreswamy teaches the use of circuit synthesis in his disclosure (see Fig. 13; col. 12, lines 19 – 41). Since circuit synthesis has become very common in the art of circuit design, and is now used to reduce design schedule and improve circuit performance, it would therefore be obvious to a person of ordinary skill in the art at the time of the invention to combine the teachings of Alpert and Doreswamy to obtain the same claimed invention.

Allowable Subject Matter

16. Claims 9 – 15 and 17 – 23 are objected to as being dependent upon a rejected base claim, but would be allowable to overcome the objections cited above, and if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. The following is a statement of reasons for the indication of allowable subject matter: these claims contain certain elements pertaining to the selection of paths in an IC design that are not disclosed in prior art.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Pub. No. US 2003/0121018 to Leung et al. discloses a subgrid detailed router that performs searches for wire locations at the grid level.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Magid Y. Dimyan whose telephone number is (571) 272-1889. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Magid Y Dimyan
Examiner
Art Unit 2825

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02 May 2005



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